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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JANUARY 9, 1943

How Can It Be Saved?

See Page 26

A SCIENCE SERVICE PUBLICATION

Do You Know?

Explosive liquid *ozone* is a deep indigo blue in color.

Even *rice pudding* has now been dehydrated for troops overseas.

Synthetic sapphires have been developed to replace imported jewel sapphire bearings.

States with the lowest records of *tuberculosis* mortality are in the Midwest and mountain areas; highest mortality is along the Mexican border.

A special course in *meteorology* for students in all the American republics is being offered by the U. S. Weather Bureau.

The *bulrushes* in Jerusalem are a new source for pressed wallboard, said to be better than cork for the interior insulation of tanks.

A new transparent *plastic windowpane,* laminated with wire mesh, withstands explosion of a 150-pound bomb eight feet away.

Special machines which spread *glue* simultaneously on both sides of the studding for wall partitions are now being employed in prefabricating plants.

For women welders: comfortable new *flameproofed* work clothes, which afford protection from flying sparks, are replacing bulky asbestos garments.

When syrup, honey or molasses replace sugar in a baked dish, a lower *temperature* should be used.

The 86 million tons of *steel* needed by American war industries in 1942 represents half the entire steel production of the world.

Some cities dispose of their sewage by selling it as *fertilizer,* after draining off the water and reducing the sludge to a fine powder mixed with potash and phosphate.

Fuselage bullet holes in airplanes can be repaired quickly by using new *explosive rivets.*

Natural rubber for the Americas is being produced from *Cryptostegia,* a flowering vine which grows wild in California, Mexico and Florida.

Tests for new *airplane tires* duplicate the wear and tear of landings and takeoffs, by repeatedly plunging the tire against a huge flywheel under 15,000 pounds of pressure.

Question Box

Page numbers of Questions discussed in this issue:

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

SCIENCE NEWS LETTER

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CHEMISTRY

Nylon After the War

Window screens, shoes, sash cord, and furniture are ready for post war use; but now nylon has gone to war. Discarded stockings turned back to chemicals.

➤ AFTER THE WAR you can have window screens of nylon, shoes of cloth coated with nylon wearing better than leather, window sash cords of nylon that won't fray out, electric wires insulated by nylon, rattan porch furniture woven from gaily colored nylon, and scores of other such things.

Nylon is the synthetic stuff that ladies' stockings used to be made of — remember? (For chemists, it is the polymer of adipic acid and hexamethylenediamine.)

Since March, 1937, Du Pont has been turning out this product of their chemists' genius and sweat. Most widely known as the material for hosiery, this synthetic, basically obtainable from coal, air and water, rescued America from the silk monopoly of the Japanese.

Now nylon has gone to war, conscripted 100% for dozens of secret military purposes.

It is for that reason that the Army-Navy E flies today over the unobtrusive and unpretentious group of buildings on historic Brandywine Creek, in Wilmington's outskirts, the nylon research laboratory and pilot plant.

Because of the vital military uses for nylon, every pound of it is precious. In normal peace times no one would suggest using as raw material the discarded finery off the legs of American women. Yet in the war emergency this is being done. The wrecked nylon stockings being left at collection depots in department stores by patriotic women are used as an emergency raw material.

From 25,000,000 to 30,000,000 pounds of nylon have been produced since 1938 and if only a small portion can be collected and reclaimed it will be a great help. Great piles of stockings retired after faithful and intimate service are awaiting resurrection — thousands of pounds of them.

The process is relatively simple. The stockings are eaten up or dissolved by sulfuric acid, the solution heated to obtain a dark mass containing adipic acid and a light brown liquor containing the diamine. Purified, these give the two shining white mother chemicals of nylon, just as pure and useful as the same chemicals synthesized from the original raw materials.

To our fighting forces in the tropics there will soon be available some experimental batches of insect screening, the "wires" of which are nylon. This is less easily torn, is resistant to weather, as copper or aluminum, and lighter in weight. A hole can be punched in this screen with a pencil point and a little straightening out will restore the screen good as new. Beautiful screens of a hundred meshes to an inch are being made for use in war production. Electric motors are being made more efficient, lighter and smaller through use of magnet wire insulated by dipping in nylon.

When nylon comes back from war, it will do more than approach that ideal of hosiery perfection, an impalpable film of color. There will be a thousand new jobs for it in the free and united world we are fighting for.

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STOCKINGS GO TO WAR—Here is a pair of the stockings that America gave Uncle Sam for Christmas starting through a new process, developed at the Du Pont Company's Nylon Research Laboratory, which chemically "unravels" the stockings down to their original chemical ingredients — adipic acid and hexamethylene-diamine. The heated hydrolyzing agent in the flask will break the stockings up into a black powder and a reddish brown liquid — first step toward making them into needed war materials. (See also picture on page 20.)

PHYSICS

New Ration Books Will Have Special Safety Paper

➤ COUNTERFEITERS who try to make illegal ration books will be stymied by highly technical and new scientific devices, declares E. W. Spencer, assistant technical director of the U. S. Government Printing Office.

Special paper structure permits easy and positive identification. Among secret safeguarding features for the new point-rationing books, will be tiny coded markings. These enable government agents to tell where stolen material left legitimate channels and illegality started. Secret markings indicate in which mill the paper was made, what plant processed it, and whose printing plates were used.

Further laboratory tests will point out the place where counterfeiting began or help trace the criminals responsible. By such methods the Government Printing Office and its laboratories are ready to protect the consumer from the counterfeiting attempts expected as a result of wider rationing and tightening restrictions, Mr. Spencer reports. The special safety paper will be just as hard to counterfeit as a twenty-dollar bill.

OPA expects to have 30 billion stamps ready to distribute this month. This exceeds 12 years' continuous production of United States postage stamps.

Government presses couldn't handle such a task in the 60 days allotted. A call for outside printers to do the job finally turned up 18 who had the capacity and were willing to produce the books in the volume desired.

They are located at Waltham, Mass.; Niagara Falls, Tuckahoe and New Rochelle, N. Y.; Hoboken, N. J.; Scranton, Pittsburgh, and Franklin, Pa.; Baltimore, Md.; Dayton, Norwalk, and Shelby, Ohio; Chicago (two plants); Houston, Texas; Minneapolis, Minn.; Oakland, and Los Angeles, Calif. As the books roll off the presses they are bundled and start on their trip to the 5,500 ration boards for citizens in every nook and cranny of the nation.

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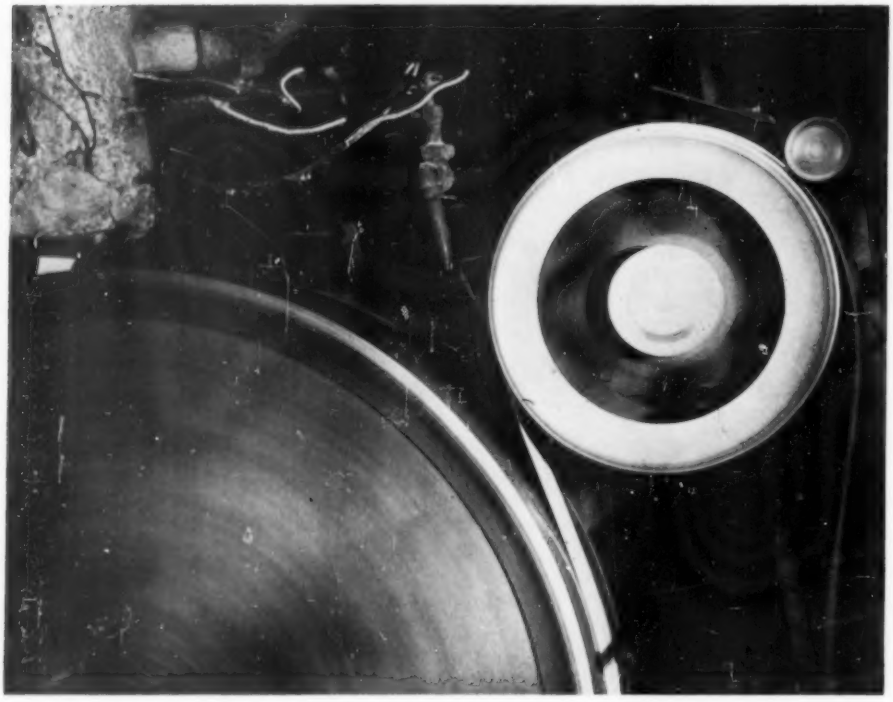

NYLON, BUT NOT FOR STOCKINGS—This wheel is part of the original equipment made in 1937 to produce the first nylon for stockings. It is still helping to produce nylon, but now it is for war purposes. Molten nylon comes out of the slot at the upper left and is solidified on the wheel in the form of a plastic ribbon which passes over the smaller guide wheel. Later it is broken into flakes and spun into yarn. (See page 19.)

ASTRONOMY

Ten Quadrillion Stars

That is the census within range of telescopes given in new book. There are about a thousand million in our own Milky Way system.

➤ TEN QUADRILLIONS of stars: 10,000,000,000,000,000. That's the modest census of the part of the universe within photographing range of our largest existing telescopes, which Prof. Harlow Shapley, director of Harvard College Observatory and vice-president of Science Service, gives in a new book, *Science in Progress,* published by the Yale University Press.

The ten chapters in the book were edited from lectures presented by ten leading American scientists, on tour over the country under the auspices of the scientific honor society, Sigma Xi. Assembling them into book form was the work of Prof. George A. Baitsell of Yale University, secretary of Sigma Xi. They present the highlights of some recent developments in astronomical, physico-chemical and biological sciences. The volume has been made a science book-of-the-month by the Science Book Club.

Prof. Shapley bases his staggering figure on a conservative estimate of the number of stars in our own galaxy, the Milky Way system—about a thousand millions of them. In the sphere of space which present telescopes can reach there are at least ten million more like it. Ten million times a thousand million multiplies out to ten quadrillion—if that number means anything.

A typical galaxy, like our own "home" mass of stars, is a more or less disk-shaped affair, perhaps 50,000 or 100,000 light-years across, frequently showing a spiral pattern in its organization. We can tell how far away other galaxies are by spotting certain types of stars in them, giants and super-giants, novae and super-novae, and comparing their known actual brightness with the much lower brightness they present because of the dimming effect of distance.

A second chapter on an astronomical subject, the expanding universe, is contributed by Prof. Edwin Hubble of the Mount Wilson Observatory. All the galaxies we know appear to be receding from our part of space at terrific rates, from 150 miles a second for nearby ones to nearly 25,000 miles a second for those near the limit of telescopic range.

That the universe is expanding (perhaps exploding would be a better word) is the only explanation at present possible for the so-called red shift of light given off by these distant masses of stars. The reddening of their light is apparently caused by a "dragging out" of the light waves as their sources speed away. Other explanations have been attempted, but, says Prof. Hubble, they have all failed. If there is another valid explanation, it involves a principle in nature of which we are still ignorant.

What fuels the terrific energy production of the stars is the cosmic puzzle taken up by Prof. Hans A. Bethe of Cornell University. Earlier theories, as that stellar heat and light are due to the gravitational compression of their substance as they shrink together, would not keep up the fires long enough. Most satisfactory, it appears, is the concept that atomic nuclei within the stars' interiors capture atomic particles (neutrons) and in so doing are transformed into other elements and at the same time give off energy.

Pressures such as those existing in the interior of the earth, if not of the stars, are described by Prof. P. W. Bridgman of Harvard University. In exceedingly massive machines, pressures measurable only in terms of dozens of tons per square inch are applied to various solids and liquids, solidly cased in massive blocks of metal so that they cannot "squeeze away." Under such pressures familiar matter assumes unfamiliar forms: a kind of ice with a temperature far above boiling, and so dense that it would sink in water; a variety of phosphorus that is black instead of yellow, and that conducts electricity instead of resisting it.

In other chapters, Dr. V. K. Zworykin of RCA Research Laboratories tells of the formation of electron images, Prof. Lionel S. Marks of Harvard University

discusses recent developments in power generation, Prof. James Franck gives glimpses of what goes on in a green plant while food is in the making, Prof. John G. Kirkwood of Cornell University presents a picture of the structure of liquids, Prof. Perrin H. Long of the Johns Hopkins University outlines the mode of action of sulfanilamide, and Prof. H. Mark of the Polytechnic Institute of Brooklyn gives the theoretical basis underlying the manufacture of synthetic rubber.

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MEDICINE

Immediate Autopsy Urged

Prompt examination of the unfortunate persons first killed in a catastrophe would greatly help the treatment of survivors, is Boston fire lesson.

➤ IMMEDIATE examination by competent pathologists of those first killed in catastrophes is urged, as one lesson of the Boston night club fire, in a report from Dr. N. W. Faxon and Dr. E. D. Churchill, director and chief, respectively, of the West Surgical Service of the Massachusetts General Hospital (*Journal, American Medical Association,* Dec. 26).

Information from such examinations of the dead and from expert accident investigators dispatched immediately to the scene would greatly aid in treatment of the surviving victims, the Boston surgeons explain. The first patients reached their hospital at 10:30 p.m. and by 1 a.m. it was clear that the predominant injuries were flesh burns and severe damage to the breathing apparatus but no information regarding the disaster could be obtained from the authorities. Poisonous fumes were suspected but definitive evidence on this is still lacking.

The "superb aid" supplied by the social service department of the hospital and the valuable assistance of other trained volunteer groups such as the Ladies Visiting Committee and War Service, Red Cross nurses' aides, and a group of Harvard undergraduates who had been doing volunteer service as orderlies for six months was both highly praised by the surgeons and cited as showing the value at times of catastrophe of trained volunteer groups familiar with a hospital. People of poise who know the hospital are "essential for most volunteer service in a disaster. This we have proved," the doctors state.

"A standard method of identification for women by bracelet, anklet or some similar method" is also strongly advised on the basis of the Boston fire experience. All but two of the 75 men dead on arrival at the hospital were identified by 5 a.m. Cards, letters, and the like in their pockets made this easy but for the women, whose coats and purses and bags had mostly been lost, only height, weight, hair color and clothing and jewelry were available. These were of only slight help for identification.

The need for a well planned and organized telephone service to notify hospital administration, staff, nurses, maintenance and department heads is another Boston fire disaster lesson. So also is the need for immediately examining and separating the living and the dead at the very entrance of the hospital. Two medical house officers should be stationed at the emergency ward entrance for this purpose.

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MEDICINE

Use Thrombin to Stop Bleeding in War Wounds

➤ THROMBIN, natural clotting agent of the blood which is formed when blood is shed, is being widely used in the U. S. S. R. as a means of stopping dangerous bleeding from war wounds and is credited with saving the lives of many wounded men, Prof. Boris Kudryashov, of Moscow University, reports.

In 1941, after long research in the laboratories of Moscow University, a method of obtaining large quantities of sterilized, dissolved thrombin was discovered. When mixed with blood this solution will clot it within three to five seconds.

Experiments on laboratory animals with this preparation confirmed the theoretical assumptions. Parenchymatic bleeding from injured liver, spleen or kidneys rapidly ceased after the wound was irrigated with thrombin solution.

The preparation was then tested in surgical clinics and hospitals with good results, after which it began to be manufactured in large quantities for use in hospitals and dressing stations.

Several soldiers with head wounds were brought to the neurosurgical clinic. In the case of two of them, shell splinters had penetrated deep into the brain and their removal was fraught with great danger, as they had lodged in the immediate vicinity of blood-carrying sinuses of the brain. The surgeon nevertheless decided to operate. When the splinters were removed, blood began to gush profusely from the sinuses but in both cases swabs steeped in thrombin and inserted into the apertures of the wounds quickly stopped the blood flow. When the swabs were removed bleeding was not resumed and recovery proceeded rapidly. One of the men had his skull shattered in the region of the temple and part of the brain protruded in the form of a large blood-filled swelling. Cutting the swelling would have caused profuse bleeding. The surgeon injected a small quantity of thrombin with a syringe. The protruding part of brain was then opened and the blood removed in the form of a clot. There was no further bleeding and the operation was quite dry.

In the short period thrombin has been in use there have been numerous instances of this kind. It has proved a valuable means not only of saving blood but also lives of wounded men.

The effect of this blood-stopping preparation in no way differs from natural blood clotting. When applied locally thrombin merely accelerates blood clotting, ten and in some cases even 100 times without, moreover, deleterious effects on the wound or on the patient. It is absolutely harmless.

Production of thrombin has now been placed on solid industrial lines on a scale fully adequate to meet the demands of the front.

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GENERAL SCIENCE

Fellowship Announced For Women Scientists

➤ WOMEN working in science were invited by Dr. Eloise Gerry, of the U. S. Forest Products Laboratory, to apply for the $1,000 fellowship of Sigma Delta Epsilon, graduate women's scientific fraternity, to be awarded after March 1. This is the second such fellowship intended to help some young woman scientist to get her doctorate in mathematical, physical or biological science.

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PUBLIC HEALTH

Health in 1942 Excellent

Outlook for 1943 is very uncertain, but we have health and medical resources to counterbalance special hazards in wartime.

By DR. LOUIS I. DUBLIN

Third Vice-President and Statistician, Metropolitan Life Insurance Company

➤ THE FORECAST which I made at the beginning of 1942 concerning the health and mortality conditions among the people of the United States contained several serious reservations. I was at that time very cautious because of the uncertainties surrounding the future. There was first of all the question of what our direct war losses might be during the year. It was also impossible to foresee with any accuracy what indirect effect the war effort might have on the health of the people.

It has been very gratifying, therefore, to find, as the year progressed, that exceptionally favorable health and mortality prevailed month after month. In fact, at the end of the first nine months of the year, the death rate was the lowest on record for this period of the year among the many millions of Industrial policyholders of the Metropolitan Life Insurance Company, a group which covers a large enough cross-section of the whole population to serve as a reliable index of the general situation. Moreover, preliminary figures for the population of the large cities of the country confirmed this trend. No epidemics of any consequence were recorded. In fact, all infectious diseases were at a low ebb. Beginning with October, however, the mortality in 1942 has been slightly higher than in the corresponding months of the previous year. But despite this setback, the whole year's experience has been exceptionally good and the death rate for the year will rank among the best on record—if it is not actually the best.

With the war uppermost in our minds, the first item of interest in the mortality picture for the year is the number of war deaths which have occurred. The record at hand is necessarily incomplete. Official reports indicate that at the end of the first year of war the number of dead, including the first returns from the African campaign, are between eight and nine thousand. With the wounded and missing included, our war casualties are in the neighborhood of 60,000 for the year. Expensive as the war has been in terms of human life, the war casualties have not, as yet, begun to compare with the loss which we normally suffer from accidents each year. It is a startling commentary on our way of life to note that each year there are as many homicides and many more suicides than the number of known battle deaths in the first year of the war.

Accidents in War

The accident situation is of particular interest this year because it is so closely related to our war effort. In the first place, the increase in industrial activity occasioned a considerable rise in occupational accidents. But at the same time, the restriction on automobile travel has reduced the number of motor vehicle fatalities. The deaths from motor vehicle accidents will be lower than last year by about a third. Other accidents in public places have been slightly higher this year than last. But, on the whole, the accident rate in 1942 will be less than in 1941.

Births in War

Another factor which is directly related to the war but which balances the mortality picture, is the sharp rise in the birth rate. Beginning with the time when the draft of men for war service appeared likely, the birth rate has risen constantly. Thus, from a figure of less than 17 per 1,000 in the middle 30's, the birth rate rose to 17.3 in 1939; to 17.9 in 1940, and to 18.9 in 1941. The preliminary figures for the first ten months of the year indicate a birth rate of approximately 20.5 per 1,000 in 1942. This increase in the birth rate not only increases the number of women exposed to the hazards of childbirth, but increases the population at the early ages where mortality is high. Fortunately, the improvement in maternal mortality has been great enough in recent years to overcome the extra hazard arising from the increase in births. The death rate from childbirth among women insured in the Metropolitan Life Insurance Company, after remaining fairly stationary in 1941, declined again in 1942. Presumably, the same thing occurred in the general population. The infant death rate was also lower.

Each of the principal communicable diseases of childhood registered rates as low as, or lower than those of last year. At the same time, the absence of any epidemic of respiratory diseases and the success of the sulfa drug therapy have

TYPICAL FLYERS — From measurements of 2,000 flyers, conducted at the Army's Aero-Medical Research Laboratory at Wright Field, it was found that these seven basic composite types of model heads could be made for the fitting of oxygen masks. Type one, at the left, is the average Army flyer. The other six types represent extremes of contours and outsizes who could not be fitted with the same mask that would fit type one. The heads were made at the Field Museum of Natural History, Chicago.

reduced the deaths from influenza and pneumonia by more than 15% in the year. Tuberculosis, which is an excellent index of the current health of the population, has recorded a minimum rate virtually every month this year.

Even the diseases of the heart, coronary arteries and kidneys, which we have come to expect to show increases corresponding to the aging of the population, recorded rates little above those of last year. Cancer and diabetes, two other important causes of death in middle and later life, showed higher rates than in 1941. For cancer, the rate was a new high; for diabetes, the increase was 3.0% but the rate is still below that of 1940.

No Serious Epidemic

We may then say that the health of the people remained excellent in 1942. There was no serious epidemic and the prevalence of the communicable diseases remained low. Likewise, there was no serious outbreak of meningitis such as occured in the camps in World War I and which it was feared might recur. The chronic degenerative diseases, although some of them showed slightly higher rates than in 1941, were, with the exception of cancer and diseases of the coronary arteries, more favorable than in the years immediately preceding. Altogether, the first year of our participation in World War II has left us virtually unscathed so far as the nation's health is concerned, a very different situation from that among the other belligerents.

But despite this excellent showing in 1942, the outlook for 1943 is still very uncertain. On the favorable side, there is an assurance that the advances in medical science and practice have made it possible for us to control the acute conditions. On the unfavorable side, there are several items of great potential danger. There is first and foremost the unpredictable number of war casualties. Certainly, there is every reason to expect that such casualties in 1943 will be far greater than they were in the past year. Secondly, there is the danger inherent in the crowded living conditions and the temporary makeshift homes in which many workers are compelled to live near the defense plants. There is also the problem of maintaining adequate heating in the buildings in the areas where the shortage of oil is most acute. It is to be hoped that the relatively unfavorable death rates recorded in the closing weeks of the year do not reflect a permanent rise resulting from these factors. In addition, there are also signs that a scarcity of physicians may develop in some localities. The absorption of hospital staffs in the Army and in the war industries has created a serious problem for many communities and their health institutions. These items may well cause us trouble if an outbreak of serious respiratory disease occurs.

Blackout a Hazard

The blackout in coastal areas to prevent the sky glow dangerous to coastwise shipping also contributes a new accident hazard. It was found in England that the blackout there contributed to a marked increase in the number of road accidents. Nevertheless auto travel restrictions should continue to reduce the number of motor vehicle accidents in spite of the poor illumination on streets and highways. Strict observation of traffic rules by pedestrians will help to minimize the danger.

But in spite of all of the uncertainties and difficulties, we can face the year 1943 with the knowledge that we have many resources available to counterbalance the special hazards. Apart from the dangers inherent in the war, there is no untoward circumstance as to the public health. We have an abundance of natural resources, an excellent medical profession and skilled health agencies which, working together with an informed public, should see us through.

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PSYCHIATRY

Promotion Depression Is Another Manpower Hazard

➤ LATEST MANPOWER hazard to be described by medical men is the Promotion Depression, or depression due to being promoted.

While most of us would be willing to risk a little depression in this cause, some people go all to pieces when faced with a raise and sudden increase in responsibility, according to Dr. Norris B. Flanagan, of Boston, reporting three recent cases in the *Journal of the American Medical Association* (Dec. 26).

Three reliable, overconscientious employees, who were suddenly shifted by war conditions to positions of increased responsibility, reacted with severe depression, reports Dr. Flanagan. Symptoms included suicidal ideas, loss of sleep and appetite, and impotence. One patient, after six weeks in a hospital, was able to adjust to a routine job, but unable to accept his promotion.

People subject to promotion depressions can be recognized by industrial doctors and personnel officers, says Dr. Flanagan, since they are generally overconscientious, reliable workers because of their fastidious, or even fussy attention to detail.

But by definition, a "boss" must be one who can delegate his work and not feel compelled to do it all himself, explains Dr. Flanagan.

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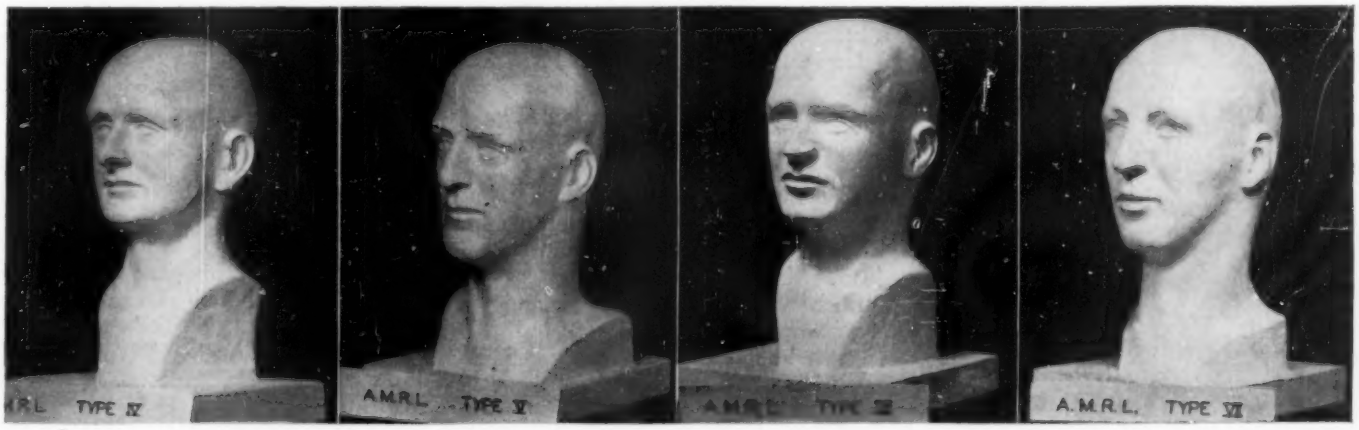

ARCHAEOLOGY

"King of the World" Unknown for 2500 Years

➤ EVER HEAR of King Ayadara?

Neither has anybody else, apparently, for the past 2,500 years or more. Yet in his time Ayadara was a combination of Hitler and Hirohito — or at least he fancied himself as such, for he was formally addressed as "King of the World."

The only trace of this pompously titled universal monarch, the only thing that tells us he ever existed, is a curved strip of bronze, dug up in pre-war days at Tell en-Nasbeh in Palestine by the late Prof. William F. Bade. It is about as thick as a penny postcard, less than half an inch wide, and represents about a third of a circle a little over six inches in diameter. When found it was crusted with oxide, but when it was finally cleaned up it disclosed a clean-cut but fragmentary inscription in the cuneiform writing of ancient Assyria. Style of the characters indicates a date perhaps between 800 and 600 B. C.

Several noted archaeologists labored over the short message on the ancient bit of bronze, states Dr. C. C. McCown, director of the Palestine Institute of Archaeology, finally evolving several possible translations. One of them addresses a dedication "to Ayadara, King of the World, for the preservation of his life. . . ."

The exact spot at which this dedicated fragment of metal was found was the bottom of a pit that had once been a cistern, in an obscure garrison post on the frontiers of Palestine.

And that is all we know about one who was once styled King of the World.

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INVENTION

Two War Inventions by Men in Armed Services

➤ TWO INVENTORS now in the armed services, one an officer in the Army, the other an enlisted man in the Navy, have received patents on devices of military value, on which they have relinquished rights, royalty-free, to the government.

Capt. Harry E. Mikkelsen, formerly of West Point but now stationed at Camp Breckenridge, Ky., was awarded patent 2,304,841 on a device useful in training young artillery officers. It is customary to save costly ammunition by doing most of the practice shooting on a miniature range, using regular gunsights and laying mechanisms, but firing small-caliber ammunition. In Capt. Mikkelsen's device, compressed air is used instead of gunpowder, further reducing costs and also avoiding fouling the barrel.

Sailor-inventor Richard B. Comstock offers what he calls a diving faceplate for shallow-water work, for patent 2,304,798. It consists of an oval frame, deep enough to cover a man's face, with a sponge-rubber cushion around the edge to make a water-tight contact, a glass window to see through, and straps to hold it firmly in place. A hose connection at the top supplies fresh air; foul air passes out of a pair of water-excluding valves at the bottom. The inventor states that for all depths less than 50 feet this simple apparatus does away with the necessity for wearing the costly, cumbrous, copper-helmeted regulation diving suit.

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ENGINEERING

No Shortlived Vehicles After the War Predicted

➤ TRUCK operators will never again be satisfied with shortlived vehicles after their experiences during this war of getting more miles out of trucks and tires than were ever supposed to be in them. This prediction was made by William J. Cumming, chief of the Vehicle Maintenance Section of the Office of Defense Transportation, at a recent meeting of the Society of Automotive Engineers in New York.

Trucks of the future, he further predicted, will be so designed that full-sized operators can drive them and mechanics who are neither contortionists nor expert at puzzles can efficiently service them. They will be designed for use rather than for looks, with parts accessible, and for safety rather than streamlined for speed. Substitute materials now used to conserve more critical materials will, many of them, still be used because of superior qualities and less weight. The new trucks will be better, lighter, cheaper, and last longer.

Tires may be improved somewhat, but already they "are better than we thought. We simply did not know how to use them," Mr. Cumming said.

Fuels will also be improved, and the engines will be more economical. Altogether he foresaw an efficiency of highway transportation never before dreamed of.

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IN SCIENCE

PHYSICS

Suggestions for Reducing Wear of Wire Ropes

➤ SUGGESTIONS for prolonging the useful life of wire rope for elevators and maintaining safety for passengers, have just been issued by the National Bureau of Standards. They were compiled by John A. Dickinson, chief of the Bureau's safety codes section.

Decreased elevator service, either by running fewer cars or by establishing skip stops, may be advisable, the report indicates. Lack of lubrication, unequal tensions, poor brake-setting, unduly high speeds with sudden stops, and other factors were cited as reasons for rapid wear of the wire ropes.

Methods for checking and correcting these items are discussed to meet an emergency need brought on by scarcity of replacement materials.

The suggestions represent views of the executive committee of the American Standard Safety Code for Elevators, Dumbwaiters and Escalators.

Science News Letter, January 9, 1943

RESOURCES

New Type Ceramic Grate To Bring Fireplace Back

➤ FLICKERING flames of the fireplace will cheer at least a million additional American homes this winter because of ceramic grates, the WPB Conservation Division announces.

Because of the ban on cast-iron grates, engineers were faced with the problem of developing a non-metallic grate. They came through with clays and other heat-resistant materials, fired and hardened at extremely high temperatures, which will save 30,000 tons of cast iron.

Fuel shortages have brought the fireplace back to many family circles. Wood, coal or charcoal may be burned in the new grates. By burning coal in the fireplace, substantial savings can be made in the fuel normally used, officials of the WPB Conservation Division point out, yet permitting an equal degree of comfort.

Science News Letter, January 9, 1943

E FIELDS

PHYSICS

Show-off Cyclist Depends On Principles of Physics

➤ WHEN RIDING a bicycle, how is it possible for you to guide it without touching the handle bars? This question on the mechanics of cycling is answered by Prof. Arthur T. Jones of Smith College, Northampton, Mas., in the *American Journal of Physics* (December).

When the cyclist shifts his weight and that of the bicycle to one side, two twisting forces make the path curve. The handle bars turn because the front assembly—wheel, fork, and handle bars—turn on an axis that is not straight up and down. This axis prolonged meets the ground in front of the point where the wheel rests on the ground. When the bicycle leans, the ground pushing upward on the bottom of the wheel turns the wheel just as a caster turns. This is the first twisting force. There is also a small twisting force due to the spin of the wheel, which aids in turning it. This is a gyroscopic effect like that which causes the gyroscopic compass to turn to the north.

Science News Letter, January 9, 1943

PHARMACY

Deadly Nightshade Is Harvested in U. S.

➤ FIELDS of belladonna, the drug called deadly night-shade, have been harvested by American farmers for the first time to replace former imports from central Europe.

Yields are good and quality is satisfactory, the U. S. Department of Agriculture reports, the average content of active constituents being almost twice the U. S. Pharmacopoeia standard.

Medicines are prepared from belladonna leaves, roots, or the potent white crystals extracted from them.

Physicians often prescribe them for such uses as relaxing asthmatic spasms, drying and dilating the bronchial tubes and to relieve pain. Belladonna liniment or plaster has long been used for relief of neuralgic or rheumatic pain and in the form of suppositories for painful hemorrhoids. Eye specialists use it extensively to facilitate examinations because it paralyzes the adjustment mechanism of the eye and dilates the pupil.

The name, bella donna, itself means "beautiful lady," referring to its use by the women of old Italy to dilate the eye pupils, giving them a more alluring luster.

Although some of the drug has been grown in this country for many years, the main source has been central Europe. But in 1940 the Bureau of Plant Industry anticipated a shortage, planted the drug for seed and has since bought seed from other sources.

This was distributed last spring to growers and between 400 and 500 acres were harvested this fall in Wisconsin, Pennsylvania, Virginia, Tennessee, Ohio and other states.

Supplies are adequate at present to meet military and civilian needs, the Agricultural Research Administration of the Department of Agriculture estimates.

Only a small acreage is needed to supply the nation, and growing drug plants is a highly specialized business, drug specialists of the Bureau of Plant Industry warn.

Science News Letter, January 9, 1943

GENERAL SCIENCE

Enemy Prisoners To Have Scientific Reading Matter

➤ SCIENTISTS who are prisoners of war in Britain will receive from their British colleagues outside the barbed wire copies of scientific journals, reprints and other reading matter that will enable them to keep their trained minds alive until peace brings them the opportunity to return to their homelands and take up again the constructive work from which dictators' commands tore them away. In *Nature* is a notice of the formation of a small organization for this purpose.

An appeal is issued for contributions of back issues of scientific publications; for most of the imprisoned scientists have not had a chance to see results of British and American research that have come out since the war began, so that there is a good deal of lost time to be made up.

Leader of the movement is John R. Baker, who lives in the country near Oxford. He states that the work of supplying scientific reading matter for British prisoners of war in enemy hands has been carried on for some time by the British Red Cross and the Order of St. John of Jerusalem.

Science News Letter, January 9, 1943

MEDICINE

Heat-Caused Clots May Be Cause of Death in Burns

➤ DEATH which follows severe burns may be due to formation of protein clots, medically known as emboli, in the capillaries, or very small blood vessels, Dr. Herman Kabat and Dr. Milton Levine, of the University of Minnesota and the Anderson Institute for Biological Research, report (*Science*, Nov. 20).

The protein clots are apparently a fine precipitate of fibrinogen which form when blood plasma is heated. Fibrinogen is the chemical parent of the substance which clots blood when it is shed. It is the size of the particles rather than their chemical constitution, however, which bears the toxic properties, the scientists found.

Blood serum and heated plasma apparently do not contain the toxic substance believed responsible for the deaths following burns. Measurements of subskin temperatures in scalds had previously shown that temperatures of 55 to 65 degrees Centigrade (131 to 145 degrees Fahrenheit) are reached and maintained for several minutes. When plasma is heated to this temperature, the fine precipitate of fibrinogen forms.

Science News Letter, January 9, 1943

PHYSICS

Electron Bombardment Improves Tinplate Making

➤ OVER half the tin formerly used in tinplate manufacture is now being saved by war development of the electrolytic plating method, H. C. Humphrey, of the radio division of Westinghouse Electric and Manufacturing Company, declares (*Electronics*, Jan.).

Electricity crackling through a metallic solution causes a thin coating of tin to be deposited on sheet steel. But this method was not completely satisfactory until research coupled electronic generators with it for induction heating. Tinplate bombarded by electrons in this method is raised to a high temperature. The tin reflows into a smooth surface free from pinhole defects, eliminating or greatly reducing the possibility of corrosion and food contamination.

Production is speeded by the unit, permitting reflow of tinplate strip on production lines at the rate of 500 feet per minute. Production in the near future, Mr. Humphrey predicts, will be speeded up to 1,000 feet per minute.

Science News Letter, January 9, 1943

CHEMISTRY

Soda Pop Gas Goes To War

Life rafts are inflated, airplane fires put out, "Mae Wests" made buoyant, and even bullets are propelled by this versatile gas, CO_2.

By HARLAND MANCHESTER

See Front Cover

➤ THE BIG BOMBER settled slowly into the sea; she was a carrier-based plane, not built to float. The three men pulled the folded rubber lifeboat from its cover and turned a valve. In a few seconds "The Raft" was inflated, and Airmen Dixon, Aldrich and Pastulla set out on their grim, 34-day ordeal which will be remembered as long as sea stories are told.

Then there was Ensign Gay, sole survivor of U. S. Torpedo Squadron Eight. He also turned a valve in a "rubber doughnut," and lived to tell his gripping tale of the picturesque inferno of Midway.

These men, and thousands like them, owe their lives to one of the most spectacular technical developments of the war—the use of soda pop gas to save men, ships, planes, engines and industrial plants. This versatile gas—carbon dioxide—is the stuff that puts the fizz in fountain drinks and the bubbles in ginger ale. In its solid form it is dry ice. It is a universal gas—every time we exhale we produce it. It has been known for some five centuries, but only recently has it been harnessed to the many vital jobs which it now performs on every battle front.

Ensign Gay, with that curious perception of detail which men sometimes show in the face of death, glanced at a metal cylinder attached to his bobbing craft, and the words, "Bloomfield, N. J." were engraved on his mind. When he was rescued he wrote to a Bloomfield friend and thanked the town for providing him with a "grandstand seat." The message was forwarded to the Walter Kidde Company, for it was at the six Kidde plants—five of them new—that the soda pop inflation devices which saved the lives of Gay, the Dixon trio and many others, were developed and produced.

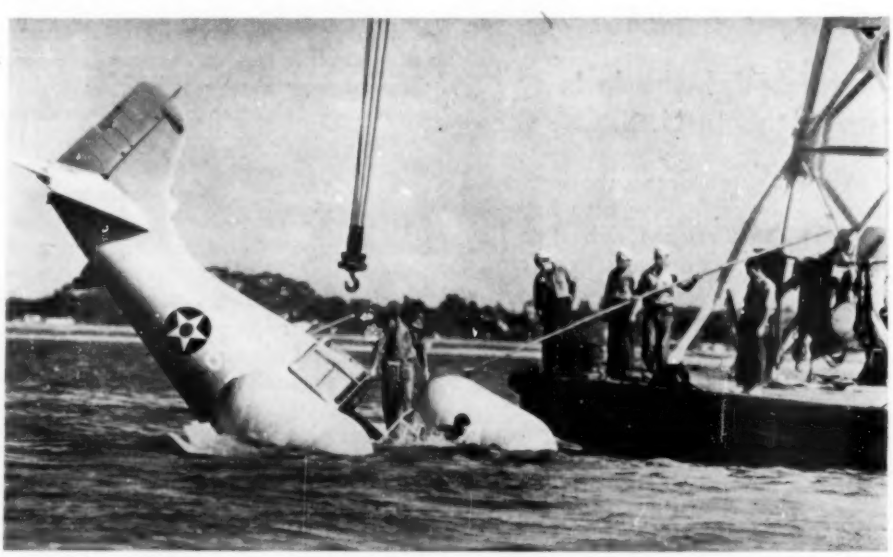
CO_2 has been applied by Kidde engineers to an amazing number of wartime uses. Packaged and geared to various devices, it kills airplane engine blazes in full flight, snuffs out and smothers fires on ships, furnishes emergency power to push down landing wheels and open bomb bays, and, of greatest importance to sea-stranded fliers and marine workers, it turns a wad of canvas into a lifeboat.

Besides the Kidde firm, a number of other concerns have been active in the development of fire-extinguishers and other devices making use of carbon dioxide. Among them are American Lafrance, Safety Fire Extinguisher Company, General Detroit Company and the Cardox Corporation. The Liquid Carbonic Company has provided fellowships for research looking toward wider industrial uses of this gas.

The big fact about CO_2 as a lifesaver is that more of it can be squeezed into a small volume than any other gas available. This makes it easy to ship to the ends of the earth in small containers. It is sent in liquid form to fill the flasks of life preservers and rafts. One quart compressed to liquid form will fill about two-and-a-half barrels when released. It will expand as much as 450 times its compressed volume.

Gas-inflatable lifesavers are now being produced by the million in all shapes and sizes. Buxom "Mae West" life vests have cartridge-like CO_2 cylinders which puff them up in two seconds. There are rubberized dinghies which are dropped by rescue planes. A man in the plane tosses out a bundle which looks like a duffel bag, hanging onto one end of a cord. When the cord snaps, the gas is released, and the boat, equipped with concentrated food, and paddles for navigation, is completely inflated when it hits the water.

One of the newest carbon dioxide lifesavers is a one-man parachute boat weighing only 12 pounds, which the pilot wears, strapped to the seat of his pants. It is now being turned out by the U. S. Rubber Company on a 'round-the-clock schedule. When the pilot bails out in his 'chute, he first inflates his "Mae West" on the way down, which keeps him afloat while he gets the lifeboat ready. This seaworthy boat, five and a half feet long, is equipped with paddles, plugs to stop up bullet holes, and a can of chemical which will stain the surrounding water with yellowish phosphorescence to attract the attention of rescuers.



AIRPLANE WATER WINGS save many planes, crashing into the water like the one on the front cover of this week's SCIENCE NEWS LETTER, from a watery grave. Large folded bags carried in wing compartments are automatically inflated by a water-sensitive device as soon as the plane makes a forced landing at sea.

Unretouched pictures photographed directly from RCA television receiver screens.

FROM TELEVISION'S ALBUM OF PROGRESS

Felix the Cat had a bewildered look on his face in 1929 when he swung around for hours on a phonograph turntable in front of television's early scanning disks. Felix's image was slashed into 60 horizontal lines—60 streaks of light and shade. Engineers of RCA watched the antics of Felix as he was tossed through space to receiving screens. They realized that all streaks and flicker must be removed.

Scientists of RCA Laboratories abandoned mechanical scanners and developed an all-electronic system of television, featuring the Iconoscope and Kinescope, electronic "eyes" of the radio camera and the receiving set. Motors and high-speed disks were eliminated both at transmitter and receiver. Electronic television became as quiet and fool-proof in operation as a home radio set.

By 1936, the number of lines per picture had been increased to 343, with marked improvement in quality. But the research men still were not satisfied. They continued to experiment, and to develop new equipment, for finer pictures of 441 lines. Before Pearl Harbor, 525-line television pictures were on the air from the NBC station atop the Empire State Building.

The streaks had vanished. Television at last had the texture of rotogravure. Now, faces and scenes are photographed directly from television screens without betraying the presence of scanning lines.

Brought to life by electronic tubes, and given wing by radio, television emerged from RCA Laboratories to reveal its practical usefulness. Today, knowledge gained from years of television research is contributing vitally to the war effort.

Recognizing the importance of television as a post-war industry and useful public service, RCA is continually pioneering in the science of radio sight. Television's album of progress has only begun.

RCA

RCA LABORATORIES

A Service of Radio Corporation of America, RCA Building, New York

PIONEER IN RADIO, ELECTRONICS, TELEVISION

Other Services of RCA: RCA Manufacturing Co., Inc. • Radiomarine Corporation of America
R.C.A. Communications, Inc. • National Broadcasting Co., Inc. • Blue Network Co., Inc. • RCA Institutes, Inc.

"Airplane water wings," another automatic CO_2 invention, have saved many a plane and pilot from a watery grave. Large folded bags carried in wing compartments, also controlled by a water-sensitive device, are inflated with the gas when the plane makes a forced landing at sea.

A dramatic new aviation role of CO_2 is to provide an emergency power house. A single pound of this highly-compressed gas, quickly released, supplies as much power over a short period as the average car engine. So a flask of CO_2 may be used as a small motor to perform a task when the regular equipment is out of order. In airplanes, for instance, the retractable landing gear is lowered, brakes are applied and bomb bay doors are opened by the pressure of oil in hydraulic systems. But if even one of these oil lines is severed in combat, the system will not work. Without supplementary power, the home-coming pilot can't get his wheels down.

Flasks of CO_2 are attached to the pistons which are ordinarily operated by oil pressure. So if the hydraulic system is knocked out, the pilot simply turns a valve on his instrument panel and CO_2 takes over. It can exert a pressure up to 150,000 pounds.

Used to Fight Fires

The most widespread war use of soda pop gas is in fighting fires. When oil and gasoline fires are blanketed with carbon dioxide, the flames are deprived of the oxygen they need, and promptly smothered. Today there is hardly a plane, tank, or ship of any size made without one or several CO_2 devices to protect against fire. And the number of laboratories and plants which have installed the gas fire-fighting systems runs into the thousands.

In the days before the CO_2 fire-killers were developed, an engine fire in the air often turned the plane into a crematory. Today steel bottles of CO_2 stand guard over engines in all our war and transport planes. Near the engine is a detector in which a filament melts at the slightest flicker of flame and sends an electrical warning to the pilot. He pulls a control on the instrument board, and CO_2 rushes through pipes to outlets encircling the engine cylinders, flooding the engine compartment with clouds of fire-smothering vapor. In a few seconds the fire is out.

Carbon dioxide is also used for the explosion-proofing of empty spaces in wings and fuselages. Before this development, the space surrounding the gasoline tanks was always a danger point. When an enemy bullet penetrated a gas tank—even the self-sealing variety—a few drops of fuel would drip out, causing dangerous vapors to form. A tracer bullet or even a spark could ignite these vapors and cause an explosion in mid-air. Now, when entering a combat zone, the pilot turns a handle on the instrument board and floods the empty spaces with the fire-killing gas, making it impossible for the explosive vapors even to form.

American tanks are protected against fire by similar uses of soda pop gas. Once a tank catches fire in combat, due to a broken fuel line or an enemy shell, the fire may last all day, twisting the tank into a useless hulk. Even before our invasion of Africa, CO_2 systems had saved many American tanks and their crews from fiery destruction.

In the marine field the gas fire-fighting equipment has been developed to its highest peak of efficiency. On big liners like the Queen Mary, there is an ingenious cabinet mounted in the control room which enables the ship's officers to detect and extinguish fires in as many as 40 different locations in the hold in less than a minute.

Like most complicated mechanisms, this one was slow in coming and was the product of many minds. It began about 1900 with a boy named Fred Meyer whose mother ran a tobacco shop in Jersey City. A ship burned off the Jersey Coast with great loss of life, and the boy brooded about it. He and his brother Richard worked out a crude system of pipes through which samples of air could be drawn from various parts of a ship. An officer sniffed at the outlets of the pipes, and when he smelled smoke, he turned a valve and steam was driven down the pipe to smother the fire.

Put on Ships

Fred's mother proudly described her son's invention to William Rich, a tobacco salesman who came to her shop. Much impressed, Rich secured capital and founded a company to make and install the apparatus. By the time he died in 1916 the system was used on 30 ships, including the Mauretania. When the firm was left without a head, Walter Freygang, son of a stockholder, persuaded his friend Walter Kidde to buy the patents. Mr. Kidde, perceiving the short-comings of the system as well as its merits, commissioned Freygang to go ahead and improve it.

FIRE!—It is much less of a nightmare to the pilot when he is protected with modern fire-fighting apparatus.

Steam was not wholly satisfactory as a fire extinguisher. It often caused more damage than the fire. Carbon dioxide proved to be the answer. A Swedish inventor named Rustige worked out a method for siphoning the gas from cylinders so that it could be used as an extinguisher. It was found that no fire could live if the expanding gas cut down the oxygen supply in the surrounding air by as much as one-third. And the gas did not damage the cargo. So Rustige's ideas were merged with those of the Jersey City boy to produce the fire-detection and CO_2 extinguishing systems now used.

To demonstrate the device, Arthur Doxsey, Kidde engineer, went to England and rented a small ship, installed the system, invited a delegation of the British Chamber of Commerce on board, and set fire to the vessel. It was almost too good a show, but the CO_2 did its work promptly and the delegates went ashore shaken but convinced.

As the system now works, air samples are constantly collected in various compartments of the hold by inverted metal bowls attached to the ceiling. Tubes from these collectors lead to the ship's control room, and an exhaust motor draws the air samples up the tubes. The tubes terminate in an upright, open-front cabinet in a kind of pipe-organ arrangement. If a wisp of smoke rises from one of the open pipe-

ends, it is clearly revealed in a shaft of light focused from below.

By watching the pipes, a ship's officer can easily detect a fire in any part of the hold. As an added precaution when he turns his back, there is an "electric eye" watchman which automatically samples the air from each of the pipes in turn, making the rounds in about two minutes. When smoke breaks the light beam, an alarm rings and a signal flashes showing the location of the fire. The smoke-sniffing pipes also act as fire hoses, and carbon dioxide rushes down the pipe to smother the flames.

Similar CO_2 fire-fighting systems have been installed in plants where fire-hazardous work is done. Sometimes the gas closes the windows and smothers the fire in the same operation. CO_2 systems are made to order for electrical power plants where liquid extinguishers are out of the question. Repositories of articles of great value, like the Archives Building at Washington, have fixed CO_2 systems, while many other establishments, like the Sterling Memorial Library at Yale, are protected by portable soda pop gas extinguishers.

The energy of expanding CO_2 is even being used to propel bullets. Ray J. Monner, Denver inventor, is manufacturing a so-called "dry-ice gun," and the Colorado Defense Force has ordered the first hundred to use in place of the Springfields taken over by the Army. A cylinder beneath the barrel is loaded with crushed "dry ice" which becomes liquefied. When the trigger is pulled, a valve is opened, and a little of the violently expanding gas drives the .22 caliber bullet from the barrel. One loading is good for 1800 shots.

This becomes less of a Buck Rogers dream when you consider that there are 30,000 foot-pounds of energy in a single pound of the compressed gas. And if it can open a bomb bay, launch a life raft, close a window and shoot a gun, it can be used for other specialized power jobs. So engineers are making plans.

Whatever these plans may come to, soda pop gas still packs its triple threat as life-saver, fire-fighter and refrigerant, and has an expanding future both in war and peace.

Science News Letter, January 9, 1943

DENTISTRY

Fingertip Control

New gadget relieving dentists' feet of control of the drill is invented by dentist who tired of being a "one legged crane."

➤ A GADGET to put dentists back on their feet has been invented by Dr. Maurice I. Blair, Chicago dentist. Dr. Blair's fingertip dental engine control, which changes the control of the dental engine from foot to hand, has just been given its first public display.

The fingertip control which, Dr. Blair reports, is the first change in drill control in 30 years, is shockproof. It is manipulated simply by a sensitive electric button on the mirror handle, which is connected by aerial wire to the drill through a two-tube radio.

Dr. Blair reports that the inspiration for this improvement was the fact that he "got awfully tired of always standing on one foot." Dentists now use the foot control which makes it necessary for one foot to be constantly on the control.

Dr. Blair also points out that the foot control is an eyesore and a nuisance since most dentists' floors are waxed to a point of slipperiness and the foot control is always slipping out of reach, with the dentist sliding with it. Many a patient who has tripped over it will bless Dr. Blair for his invention.

In the two years that it took Dr. Blair to perfect his invention he ran across many disappointments when he found it impossible to use his original idea of placing the button directly on the drill. However, he hit upon the safe and happy idea of placing it in the mirror handle and it has proved to be successful.

After the end of the war, Dr. Blair's control will be manufactured so that other dentists may share in his invention.

"I am now working on an improvement which will use a low voltage switch to start and stop the dental engine, thus eliminating the radio circuit which has given a little trouble in some areas because of interference," Dr. Blair has just reported.

"I am more convinced than ever that the foot control must go in order to eliminate the fatigue which it gives to dentists who are one-legged cranes every time they operate the dental engine."

Science News Letter, January 9, 1943

ENGINEERING

Tire Wear on Passenger Cars Reduced by Half

➤ TIRE WEAR on passenger cars is now less than half as great as it was a year ago on main rural highways, a new report by O. K. Norman, highway engineer-economist of the Public Roads Administration, indicates. Traffic counts made after rationing showed 40% reduction compared to traffic a year ago. There was also a fourth less tire wear per travelled mile, due to lower speeds, according to studies by the Public Roads Administration and state highway departments.

More than half the drivers travel at speeds over 35 miles per hour, a survey in rationed areas indicated. Average for passenger cars was 36.6 miles per hour in a rationed area, and only 37 even in areas that were not rationed at the time of the survey.

Trucks now travel at about the same speed as passenger cars. Prior to rationing and the new speed limit, average car speed was nearly 50 miles per hour.

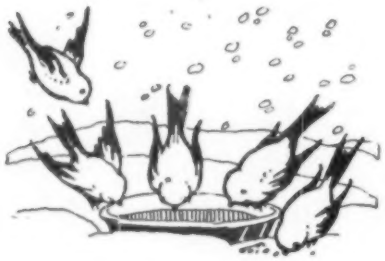
Considering that there has been little enforcement of the 35-mile speed in some states, it is encouraging to find that so few drivers travel at speeds more than five miles per hour in excess of the limit, Mr. Norman stated.

Most of the studies on the 35-mile limit were conducted within a month after the new law became effective. Since many states had not started to enforce the reduced limit or changed their speed signs at that time, Mr. Norman points out that a further decrease in average speeds is probably now in progress.

Science News Letter, January 9, 1943

WILDLIFE

NATURE RAMBLINGS
by Frank Thone



Remember the Birds

➤ WINTER came early this year. It has been cold over most of the country, even in the South, and in the North the first snow had not melted when other snows added themselves to it.

This means that the birds are having a harder time this year than they have for several seasons past, and it will be necessary for us to think of them oftener and feed them a little more. They are entitled to this aid, for they do a good deal for us when times are better, both as insect fighters and weed-seed destroyers; not to mention the lift that most of us get just from seeing them and hearing them sing.

Even with wartime rationing beginning to come into effect, we can still spare all the birds will need and never miss it. Table crumbs and old bread-crusts will satisfy many of them. Adding a few cents' worth of cracked wheat will make the meal a banquet for the seed-eating species. For those that need a certain amount of animal food, like the woodpeckers, the traditional lump of suet, well wired, is easy to provide. One ingenious housewife encloses her contribution of suet in an old wire soap-holder stapled against a tree; she reports this gadget a decided success.

Many persons who consistently feed birds during severe seasons do not happen to think that their feathered clients need water to drink as well. In mild winter weather there are usually plenty of unfrozen sources of drinking water for the birds, but when zero temperatures prevail for several days all water outdoors is locked into ice, and the poor birds often suffer more from thirst than they do from hunger.

So it is a good idea to set out a pan of water when you scatter your crumbs or fill your feeding tray. It should of course, be placed as clear as possible of cat danger; either in the empty bird bath or on some other high spot, or at least in a clear space too wide to permit a stalking Tabby or Tom to sneak up unobserved.

The water should be warm when it is set out—as warm as good hot coffee or soup. Cold water quickly freezes.

Science News Letter, January 9, 1943

NUTRITION

Nutrition Standards

Here is a daily diet for the nutritive standards that Secretary of Agriculture Wickard says can be met by foods that will be available in 1943.

➤ THE NUTRITIVE standards which Secretary Wickard says can be met by the foods available for civilians in 1943 when translated from laboratory terms of allowances for vitamins, minerals, protein and so on, call for the following daily diet:

One pint of milk daily for an adult, more for children.

One serving of meat.

One egg daily, or some suitable substitute such as beans.

Two servings of vegetables daily, one of which should be green or yellow.

Two servings of fruit daily, one of which should be a good source of vitamin C, such as the citrus fruits or tomatoes.

Bread, flour and cereal, most and preferably all of it whole grain or the new, enriched bread, flour and cereals.

Some butter daily, or margarine with vitamin A added.

Other foods to satisfy the appetite.

Total number of calories are set at 3,000 for a moderately active man and 2,500 for a moderately active woman.

The nutritive standards, drawn up by the National Research Council for the National Nutrition Conference for Defense in 1941, were translated into the above diet by Dr. Lydia J. Roberts, of the University of Chicago.

Smaller allowances of milk and lean meat are hinted in the Secretary's statement that the only nutrients we will have less than the standards require are calcium, niacin and riboflavin. Milk is the best food source of calcium and riboflavin, and milk, liver, lean pork, lean beef, and egg yolk are generally given as best sources of niacin, the pellagra-preventing vitamin, although leafy green vegetables, green peas and soybeans are also listed as good sources of this vitamin.

Science News Letter, January 9, 1943

• New Machines and Gadgets •

A "memory" device which retains the image of an electric flash long enough for it to be photographed (1/25 second) has been developed to study unpredictable flashes or surges on electrical equipment. A film of fluorescent mineral briefly holds the image of what is happening as transmitted by a small beam of electrons. In much the same way, the human eye retains momentarily the image transmitted by light rays until the nerve system relays it to the brain.

Science News Letter, January 9, 1943

THE TINY gadget which the Army Air Corps sergeant is shown examining in the picture, is an automatic device that operates the built-in fire extinguishing system aboard U. S. bombing planes in case of crash landing. A carefully balanced electrical trigger discharges carbon dioxide into the engine compartments and prevents the fires which usually follow a crash.

Science News Letter, January 9, 1943

A MOBILE "blitz buggy" carries equipment for emergency pumping, decontamination and purification of water. In case of air raids, it can provide water for either drinking or fire fighting. The chemical chamber is made of a crystal-clear plastic, light in weight, virtually unbreakable and transparent, which allows the operator to keep a constant check on the chlorine or other chemical being used to purify the water.

Science News Letter, January 9, 1943

SYNTHETIC white sapphires are now being produced here to satisfy the war demands of all the United Nations. They replace the synthetic gems formerly imported from abroad. White synthetic sapphires are crystal-clear pure aluminum oxide, also called corundum. It is next to the diamond in hardness. Production has been allocated for essential industrial and military uses, such as jewel bearings of chronometers, compasses, and electrical, fire-control, or aircraft instruments. They are also being tested as thread guides in textile mills, as orifices for flow meters, and for many other uses.

Science News Letter, January 9, 1943

NEW PLASTIC jar rings recently developed are applicable for both home and commercial canning of foods. The jar-closures have stood up under tests by the Department of Agriculture and responsible packers, the manufacturer reports. The necessary raw materials are available in unlimited quantities at the present time.

Science News Letter, January 9, 1943

A NEW drink mixer automatically starts when the mixing vessel is in position and stops after a specified period of mixing. The drink container is then automatically lowered and the mixing element continues to rotate for a short time, thus reducing drippage. Controls are provided for regulating both the speed and length of mixing.

Science News Letter, January 9, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 138.*

Books of the Week

AMERICA FLEDGES WINGS—The History of the Daniel Guggenheim Fund for the Promotion of Aeronautics — Reginald M. Cleveland—*Pitman*, 224 p., illus., $2.50.

ATOMS, ROCKS AND GALAXIES—A Survey in Physical Science—by John Stuart Allen and others. *Harper*, 719 p., illus., $3.75. Revised edition.

FLYING HEALTH—M. Martyn Kafka—*Military Publishing Co.*, 248 p., illus., $2.

INFANT AND CHILD IN THE CULTURE OF TODAY—Arnold Gesell and Frances L. Ilg —*Harper*, 399 p., illus., $4.

LABORATORY DIRECTIONS IN BIOCHEMISTRY —Victor C. Myers—*Mosby*, 288 p., illus., $3.50.

"OILINESS" — Arthur W. Burwell — *Alox Corp.*, 92 p., $5, except to technical men who must apply on company letterhead directly to publisher, and commissioned officers in U. S. Army. Third edition.

SHIP STRUCTURE AND BLUEPRINT READING —H. L. Heed—*Cornell Maritime Press*— 258 p., illus., $2.50. "This book is written for the sole purpose of teaching the men who are building the ships to read the prints."

THE SPECIFIC HEATS OF CERTAIN GASES OVER WIDE RANGES OF PRESSURES AND TEMPERATURES — Frank O. Ellenwood, Nicholas Kulik, and Norman R. Gay—*Cornell Univ. Press*—22 p., illus., free upon direct application to Engineering Experiment Station, Cornell Univ.

TECHNIQUE OF PLYWOOD — by Charles Brazer Norris—*Laucks*, 249 p., illus., tables, diagr., $2.50. Reprints of series published in "Hardwood Record" from March 1937 to July 1939.

YOUR PERSONALITY AND YOUR JOB—Paul W. Chapman—*Science Research Associates* —56 p., illus., 60c. American job series. Occupational Monograph 31.

Science News Letter, January 9, 1943

● RADIO

Saturday, January 16, 1:30 p.m., EWT.

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Trendley Bean, of the National Institute of Health, will discuss "Teeth and Tooth Decay."

Monday, January 11, 9:15 a.m., EWT; 2:30 p.m., CWT; 9:30 a.m., MWT; and 1:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Lost Worlds" will be the subject of the program.

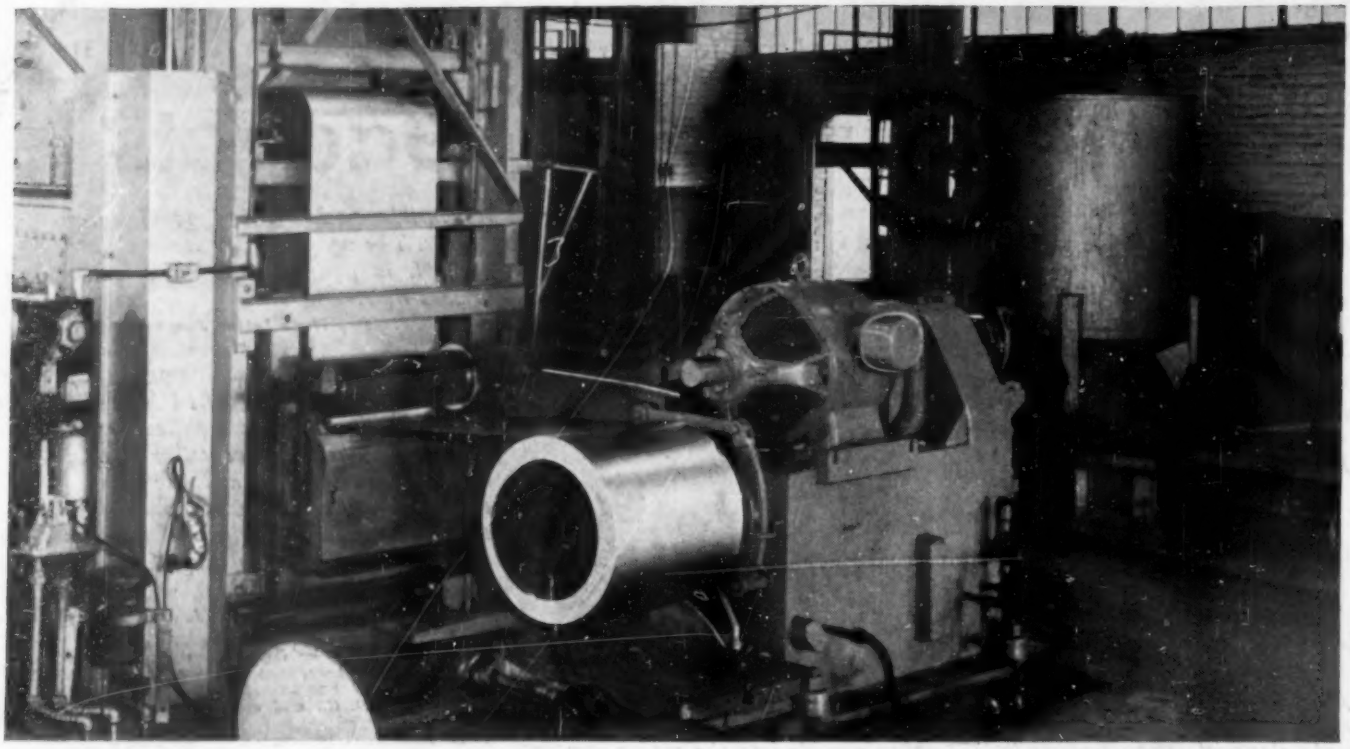


Photo courtesy of the Crown Cork & Seal Company

The best news about tin since we went to war

WHEN the Japs overran Malaya and the East Indies, they thought they had dealt a staggering blow to America.

For, overnight, tin became a most critical raw material, because America relies upon this bright metal for tin plate, bearing alloys, solder, collapsible tubes . . . *but mostly tin plate.*

However, Uncle Sam had an ace in the hole . . . *electrolytic tin plate.* In this process tin is deposited electrolytically on steel strip. And only *one third* the tin used in the old hot-dipped process is required.

Unfortunately, electrolytic tin plate is far from perfect as it comes from the plating baths. It is porous and does not provide a good protective coating.

Right here Westinghouse stepped into the picture.

Engineers in the Westinghouse Research Laboratories decided that the porous tin coating could be *fused* . . . through the magic of electronics . . . to give the tin plate the desired protective coating.

These scientists built a high-frequency coil, using radio broadcasting oscillator tubes for their power source. Through this coil they passed electrolytic tin plate. The inductive heating effect melted the tin coating . . . refining it and giving it the necessary corrosion-resistant properties.

The new Westinghouse tin flowing process is now in actual use, turning out gleaming ribbons of tin plate at better than 500 feet per minute. It will help save thousands of tons of tin every year.

Another example of *electronics at work* . . . through Westinghouse "know how"!

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE